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ABSTRACT

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Joseph F. Follettie

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Joseph F. Follettie

Cable television and/or satellite transmission advances make it probable that interactive instruction in "the privacy of one's own home" will be available to Americans well before the end of the century. This eventuality creates new goals--both positive and negative--that warrant explicit recognition and future consideration in an educational R&D context.

Consider first the negative goals. The theme of humans as ultimately physically isolated in their homes more or less from cradle to grave, with informational and other needs satisfied by electronic and other mechanisms, is recurrent in science fiction. This universal incarceration view of a life that minimizes human contact would be flat at best and a nightmare at worst. A society of near-impenetrable domiciles would reduce people to a state of artificial intelligence, complicated too often by unrequited human needs. As a society, we may increasingly find it necessary to define and promote meaningful human interactions that counteract the tendencies of complexity and affluence to isolate the individual. If there is a negative implication of shifting the locus of some facets of instruction now located in the schools to the home, any lost sense of community that arises from so doing can and should be counteracted through positive action.

Now consider the positive goals. It does not follow from a commitment to social interaction that we should place a high value on

travelling to the market to obtain the stock quotations or to a remote office to deliver a business message. Americans today journey much too often great distances in sealed compartments to places of commerce and enlightenment wherein they interact far more with mechanisms than with other humans. There is little point in bringing people to information that can be expressed electronically without attenuation if the technology permits us rather to bring the information to people. Moreover, there is little point in bringing learners to interactive instruction that can be expressed electronically without attenuation if technology permits us rather to bring the interactive instruction to learners. Such instruction in the home should prove acceptable at whatever time technology can make delivery under the conditions of parity of instructional effectiveness in home and school and superior cost-return instructional efficiency in the home.

That interactive instruction in the home eventually should prove more productive than the same instruction in the schools for certain educational objectives does not argue that a society's educational objectives can all be attained by interfacing the learner exclusively with a teaching system that is revealed to the learner in electronic representation. Much of education--e.g., socialization, democratization, responding to emergencies involving people, team motor skills such as square dancing--compels that other people be used as important components of the instructional treatment. Not all instruction probably ever will be interactive. Of that which is, not all of it probably ever will pass the test of electronic representation without attenuation.

Electronic representation of the teaching system too often is misconstrued as equivalent to the automation of education. We can, of course, very nearly automate the teaching system now with regard to such restricted academic instructional programs as those addressing word attack skills and arithmetic computational skills. The pertinent skills analyses and supporting pedagogy are acceptably comprehended in a few such instructional domains and the technology is for the most part shelf-item (although machines yet have problems decoding speech, even at the word and subword levels that are consonant with full automation of word attack instruction). However, it will not be possible to automate the teaching system with regard to the full range of academic instruction until technology provides artificial intelligence mechanisms that capture approximately the full range of human intellectual capabilities, an apparently quite remote eventuality. Although contemporary and near-future electronic representation of the teaching system can substitute television images and surrogates for the human instructor, it does not imply a teaching system that is emancipated from a need to make use of human instructors (or the instructional design-development personnel who stand behind instructors). The tendency of some to equate electronic representation of the teaching system with its automation reflects faulty perception of the situation. Whether or not provided with computer assistance for the purposes of managing and, to a lesser extent, designing and developing instruction, the contemporary system is, and near-future follow-ons will be, an organism-machine mix, rather than the teaching machine with which modern Don Quixotes too often joust.

What we are talking about, then, is a) an interactive form of instruction, b) that is appropriate only to the treatment of certain educational objectives, c) presented in the home by electronic representation without attenuation, d) a few decades hence when it promises to be more productive that alternatively-sited instruction, e) where the remote teaching system that stands behind the instruction is a man-machine mix. Agreeing that such an eventuality will be achieved a few decades hence, the question of interest here is whether it is compelling, for purposes of formulating longer-term plans, to reference such plans to interactive instruction in the home.

Parker & Dunn (1972) suggest that the expansion of cable television networks alone will make it feasible to treat the home as an appreciable locus of instruction 15 years hence. They note that home instruction will be less extensive and effective at the time if we do not begin acting now to specify the sorts of skills that might be appropriate to treatment in the home and attendant characteristics that home terminal systems must have to ensure optimally extensive and effective home instruction. Based on certain assumptions concerning extent of use, their economic analysis suggests that pure interactive instruction in the home 15 years hence will be prohibitively expensive. However, their cost projection for interactive instruction in the home--$10-$15 per pupil hour--assumes that the pupil is tied to the teaching system via a dedicated line or channel throughout instruction. Assuming that the economic unviability of interactive instruction in the home that Parker & Dunn foresee could be overcome--by mixing one-way broadcasts with

two-way communications over dedicated lines and by providing minicomputers in the home and placing them in communication with the remote teaching system during nighttime noninstructional hours--how do the implications for educational R&D differ, depending on whether interactive instruction is sited in the home or in the school?

Using somewhat different assumptions concerning extent of use, but under the condition of a high level of use per terminal, Jamison, Fletcher, Suppes, & Atkinson (1971) engage in a similar economic analysis of interactive instruction in widely-separated rural schools. The Jamison et al. analysis seeks to establish economic viability of existing interactive instructional treatments referencing to existing computer-assisted teaching systems. Using satellite communication rather than cable television, Jamison et al. present cost information from which one can conclude that the per pupil hourly cost of interactive instruction, referenced to the year 1975, is approximately $2 per hour. Satellite communication, heavy usage of terminals, and constraints placed on pupil selection of programs contribute to the difference in per pupil hour costs for Jamison et al. and Parker & Dunn systems.

The Jamison et al. analysis suggests that in the shorter term it does not really matter whether we view the ultimate locus of interactive instruction as in the home or in the school. The challenge to provide such instruction to pupils in remote rural areas introduces many of the same technical problems that require resolution before interactive instruction in the home can be made economically viable. Whatever view

is taken on the longer-term siting of interactive instruction, most of the crucial questions remain the same--e.g.:

1. What mix of central and smaller computers will be required?
2. What mixes of communication line-channel forms will be required?
3. How will users be netted to teaching systems?
4. What characteristics will the user terminal systems have?
5. What pedagogical principles apply to decisions referencing to each of the foregoing questions?

Jamison et al. provide evidence in support of the view that instruction that is appreciably interactive will find its largest market among those requiring compensatory education that supplements customary instruction. This considered together with potential savings in transportation time and costs, it is quite entertainable that much instruction that is appreciably interactive eventually should gravitate to the home. However, the present meager evidence warrants the view that efforts that site such instruction in the schools--and particularly in the widely separated smaller school of sparsely-populated rural regions--will address most of the technical issues bearing upon the development and installation of economically viable and effective interactive instruction in the home. Setting aside the pedagogical issue concerning differential strategies for insuring participation, the longer-term school-sited objectives of Jamison et al. appear quite compatible with the longer-term home-sited objectives of Parker & Dunn. In consequence, the shorter-term efforts that Jamison et al. illustrate should bear upon

the Parker & Dunn longer-term objectives. Of course, we will not be able to specify the time relations that should hold between the shorter-term efforts that the Jamison et al. effort exemplarizes until more-definitive longer-term objectives and plans are available than those presently in existence.

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